A CHILD RESISTANT CARTON PACKAGE

The invention relates to a child resistant carton package, the package comprising an outer sleeve of fiber-based material, an insert that can be slidingly drawn out from the sleeve, the insert carrying the packaged product, and a locking mechanism between the sleeve and the insert, for preventing a child from drawing the insert out of the sleeve. Furthermore, the invention covers use of specific fiber-based boards for such carton packages.

Consumer packages for pharmaceutical or other products posing a risk for small children must be designed so as to hinder an easy access by a child to the contents of the package. In box type packages consisting of a sleeve and a sliding insert that can be pulled out of the sleeve this has been achieved by locking mechanisms dimensioned so as to require the hand of an average adult for their ready operation. There are standards for child resistance defining tests such packages should pass so as to be acceptable to the market, most notably the international standard ISO 8317.

Child-proof pharmaceutical packages with locking means have been manufactured of plastics, but more recently also paperboard and cardboard have been introduced or suggested as materials for such packages.

EP 1 002 744 A1 describes a two piece paperboard package with a child resistant locking system arranged between an inner paperboard slide card housing a product and an outer paperboard sleeve. For locking the pieces the system has a tab in the inner slide coming into contact with a shoulder on the inside of the sleeve. Releasing the parts takes place by pressing a release button. The paperboard used is described as being within the thickness range of 0.2 to 0.7 mm and usually has clay coating either on one side surface or on both sides. The coating is taught to provide a high degree of smoothness and superior graphic print surface.

A weakness in the mechanism according to EP 1 002 744 A1 is pointed out in WO 02/38454 A1, namely the locking system being dependent on selection of a sufficiently thick material for the outer sleeve. A material that is too thin can put the locking security at risk. The teachings in WO 02/38454 A1 are for an improved structure in order to achieve locking that is secure and resistant to wear in repeated use even if a thin cardboard material is used.

More specifically, the child resistant package described in WO 02/38454 A1 comprises an outer sleeve and a slidable insert made by folding and gluing of sheets of cardboard and is provided with a locking system therebetween. The sleeve is provided on its inside with a catch tab and an operating tab arranged consecutively in the sliding direction of the insert beside the opposite side walls of the sleeve. The insert is provided with locking tabs, similarly beside its opposite side walls. For being made of cardboard the tabs in the sleeve and in the insert are flexible. As the insert is pushed into the sleeve the locking tabs slide under the catch tabs and end up under the operating tabs. However, the two catch tabs have a downward inclination in the sliding direction so that they will engage with the locking tabs to prevent the sleeve from being drawn out. To open the package the user has to press with one hand's fingers the operating tabs against the locking tabs through two holes in the sleeve, to release the locking tabs from the engagement and thus allow withdrawal of the insert from the sleeve by the other hand.

In a previous, so far unpublished international application PCT/SE02/01600 owned by the present applicant there is described an improved locking system for a two-part paperboard package for pharmaceuticals etc. A specific feature of said package is the location of the holes for releasing the locking mechanism in the opposite edges or side walls of the outer sleeve. Generally the teachings aim at simplifying the structure and making it easier to manufacture.

A further prior art two-part carton package for pharmaceuticals is described in US 6 491 211 B1. The outer carton is taught to be formed of a blank of any suitable material, paperboard of sulfate, clay-coated newsback or recycled paperboard, having a thickness of 0.008 to 0.028 inch (about 0.2 to 0.7 mm), being specifically preferred.

A different type of pharmaceutical packages are press-through or blister packs comprising a plastics sheet with flexible bubbles and a sheet of rupturable aluminium foil attached to the plastics sheet. The pills contained in the compartments or blisters between the sheets are removed by pressing, so as to force them through the rupturing foil. In EP 0 771 737 B1 there is described a blister pack, which is made child resistant by providing it with a backing sheet that cannot be ruptured, the backing sheet comprising a heat seal layer, a foil layer, a layer of polyester of other strong polymer material and an outer paper layer for printing. The backing sheet has a nearly invisible score cut as an opening feature to let the package be opened by peeling off of the backing sheet, use of the opening feature

requiring the cognitive skills of an adult, in contrast to that of a child not being able to use it. WO 03/066323 A1 further describes a laminate for child-resistant blister packs comprising a heat seal layer, a tear-resistant polymer layer and a paperboard substrate for printing. The laminate is provided with areas of controlled weakness to direct opening of the package according to instructions, which are easily followed by an adult but not by a child.

As a material for disposable consumer packages fiber-based board is generally preferable to plastics, due to lower material or manufacturing costs and environmental aspects. However, as carton packages have been subjected to child safety tests by the present applicant it has unexpectedly turned out that in spite of the advances made, such packages still easily fail to fulfil the requirements. While the prior art so far has concentrated on improving the locking mechanism, to add its structural rigidity and wear-resistance and to make it resistant to a child's tampering, the tests reveal that the weak point is no more the design of the locking mechanism but rather the material itself. Whether for curiosity or any other reason, a child can all too easily open a board package and gain access to its contents simply by tearing it apart.

A feature apt to trigger a child's interest in the package is the holes or other accessories required by the locking mechanism. However, rather than from the holes, a child would tear the sleeve starting from the insert opening or the seals, where the material will lose integrity and break off.

The object of the invention is thus to provide a carton package of fiber-based material for pharmaceuticals etc. that overcomes the structural weakness problem discussed above. In particular, the invention has the object of providing a package which better prevents the access of children to the contents by modification of the fiber-based material used for the package. Thereby a package with improved child resistance may be obtained while substantially preserving the advantages of paperboard or cardboard materials in comparison with the all-plastic packages as used in the prior art.

The invention has in particular the object of providing added strength for the package without any need to change its overall design and manufacture, so that the improvement is easy to put into practice and, except the material, does not increase the manufacturing costs of the package.

According to the invention the above objects are achieved through a child resistant two-part carton package for a pharmaceutical product or other products that might be dangerous for children, which has an outer sleeve that is made of board reinforced with extrusion coated polymer to increase its resistance to tearing.

The reinforcement may be a layer of tough polymer coated onto the fiber-based board. Suitable coating polymers for use in the invention are those selected from the group consisting of polyester, polyamide, polypropene and polycarbonate, polyesters being preferred, and among them, polyethylene terephtalate (PET) being particularly preferred.

The board may have a polymer coating on one side thereof, this side then being used for the outer side of the sleeve. A polymer coating covering the outside of the sleeve prevents a child from wetting and tearing the material with her teeth. However, the board is preferably provided on both sides thereof with a coating layer of a tough polymer. In either case the coating polymer may be used to form the heat seals needed to hold the sleeve folded from a blank of the coated board together.

More preferably, the board is provided with a multilayer coating comprising an inner reinforcement layer of a tough polymer such as PET and an outer heat seal layer of polyolefin. Such multilayer coating can be on one side or, preferably, on both sides of the board. The adjacent layers can be brought to the board simultaneously by coextrusion.

In a carton package according to the invention not only the sleeve but also the insert can be made of board coated with a reinforcement layer of tough polymer. Especially the end face of the insert closing the open end of the sleeve advantageously has a polymer coating so that the outside of the package has a similar polymer reinforcement throughout. Preferably the insert is made of the same polymer extrusion coated board as the outer sleeve.

The reinforced board used especially for the outer sleeve of the carton package may have such a structure that it delaminates under a sufficient tearing force subjected to its raw cutting edge. It has been found that even in case of such a rupture the inner material layers, including a polymer coating on the inside, together with the heat sealings may hold the package closed and thus succeed in preventing the child to get access to its contents.

Alternatively, specific measures can be taken to reinforce the cut edges at least on the outside of the outer sleeve so that delamination, i.e. peeling off of an outer material layer, is prevented in the first place. Skiving and folding of the edges of a polymer coated board, application of glue to the cut edges, or covering the edges with a protecive film may be mentioned as examples of such techniques.

A carton package according to the invention may be constructed so that the sleeve comprises four longitudinal side walls parallel to the sliding direction of the insert, a rear wall, and an open end to let the insert be drawn out of the sleeve, and that the locking mechanism comprises a first stop tab in the sleeve, the first stop tab extending from a first to a second of the longitudinal walls and being at least partly separated from the first longitudinal wall and the second longitudinal wall, and a first locking edge provided in the insert, the insert being prevented, upon contact of the first locking edge with the first stop tab, from moving out of the sleeve, while the first locking edge can, through elastic deforming of a part of the insert by a user, be moved so that its movement past the first stop tab is made possible.

For operation of the locking mechanism the outer sleeve may have one or more holes permitting release of the locking by the user's finger.

The invention also comprises use of polymer extrusion coated board for a child resistant carton package for a dangerous product such as a pharmaceutical, the package comprising an outer sleeve, a slidable insert and a locking mechanism between the outer sleeve and the insert.

The coated board for use according to the invention is as already described. A board coated on both sides with a reinforcing tough polymer, such as PET, and a heat sealing polymer such as polyolefin is thus preferred.

Such a board reinforced with an extruded polymer coating may be used for the outer sleeve as well as for the slidable insert and would then also form the locking mechanism parts of the carton package.

The board base for use in the invention may be kraft board of a weight in the interval 170 to 500 g/m^2, preferably 200 to 300 g/m^2. The extruded coating layers of PET or other suitable tough polymer may have a weight of 30 to 100 g/m^2, preferably 40 to 60 g/m^2. The extruded outer heat seal layers of polyolefin such as

low density polyethylene (LDPE) or polypropene (PP) may be of a weight of 15 to 60 g/m^2, preferably 20 to 40 g/m^2. The coated board is used for the outer sleeve or the insert or both, the polymer coating reinforcing the board by way of increasing its tearing strength, with benefit to at least 2000 mN and preferably more than 2500 mN according to standard SCAN-P 11:96.

The invention will be described in detail below with reference to the drawings, in which

- Fig. 1 shows a perspective view of a package according to an embodiment of the invention,
- Fig. 2 shows another perspective view of the package in Fig. 1,
- Fig. 3 shows a manufacturing blank for a part of the package in Fig. 1,
- Fig. 4 shows a perspective view of a part of the package which has been manufactured from the manufacturing blank in Fig. 3, certain concealed parts being marked by broken lines,
- Fig. 5 shows in perspective a cut-out part of the part in Fig. 4,
- Fig. 6 shows a perspective view of a part of the package in Fig. 1,
- Fig. 7 shows a manufacturing blank for the part in Fig. 6,
- Fig. 8 shows a transverse section of a part of the package in Figs 1 and 2,
- Fig. 9 shows as a schematic cross-section a material applicable for the package according to Figs 1 - 8,
- Fig. 10 shows as a schematic cross-section another material applicable for packages according to the invention,
- Fig. 11 is a cross-section XI – XI from Fig. 2, showing in a schematic manner the material used in the package according to Figs 1 - 8,
- Fig. 12 shows a bottom view of the package corresponding to that in Fig. 1 and having shielded cutting edges at the seams,
- Fig. 13 shows in cross-section a skived edge portion of a blank for a part of a package according to the invention,
- Fig. 14 is a cross-section XIV – XIV from Fig. 12, showing a seam area of the package formed by use of the blank in Fig. 13, the seam comprising the skived edge portion,
- Fig. 15 corresponds to Fig. 12, showing in a bottom view a variation of the package according to the invention,
- Fig. 16 shows a bottom view of a further variation of the package according to the invention, and
- Fig. 17 shows a part of a still further variation of the package according to the invention.

For its general structure the package shown in Figures 1 – 8 is described in PCT/SE02/01600, which is hereby incorporated by reference in the present disclosure. Further examples of package structures with locking mechanisms applicable in connection with the present invention may be found in WO 02/38454 A1, the latter publication being also incorporated by reference in the present disclosure.

Figure 1 shows a package 1 according to a preferred embodiment of the invention. The package comprises an outer sleeve 2 of essentially parallelepipedal shape, and an insert 3 intended to hold the contents of the package. The sleeve 2 and the insert 3 are preferably produced by folding and heat sealing blanks made of extrusion coated cardboard material (see below). The insert 3 can be inserted into and withdrawn from the sleeve 2 in a sliding direction S, indicated by a double arrow in Fig. 1, through an opening 4 in the sleeve 2. Fig. 1 shows the package 1 in the completely inserted state of the insert. Fig. 2 shows the package 1 in a partly withdrawn state of the insert 3, access to the contents of the package being possible.

The sleeve 2 comprises four longitudinal walls which are essentially parallel to the sliding direction S. The longitudinal walls are an upper wall 2a, a lower wall 2b, a first side wall 2c and a second side wall 2d, the upper wall 2a and the first side wall 2c being visible in Figs 1 and 2.

At the opening 4, the side walls 2c, 2d each have gripping notches 5, at each of which the insert 3 can be gripped by a finger in order to be drawn out. The width of the package is preferably adapted so that the insert 3 can be gripped only by people who have sufficiently large hands for this. This means that small children cannot reach across the width of the package with a thumb/forefinger grip in order to draw the insert 3 out.

At one end, the insert 3 preferably has a beam-like part 6 which is produced by folding an insert blank (see below). The beam has such stiffness that it is impossible or extremely difficult for a child to deform the end of the insert and in this way reach the contents of the package.

At the opening 4, the sleeve 2 preferably has two tabs which are folded inwards essentially parallel to the upper wall 2a and the lower wall 2b, respectively, (see below). This means that an upper and a lower edge at the opening 4 are reinforced,

making it impossible or difficult for children to tear open the sleeve 2 at these edges in order to reach the contents of the package.

Fig. 3 shows a sleeve blank 2' made of extrusion coated cardboard, which is formed into the sleeve 2 by folding and heat sealing. As can be seen in Fig. 3, the sleeve blank 2' comprises the two tabs 21, 22 which, as mentioned above, reinforce the opening 4 of the sleeve by being folded inwards essentially parallel to the upper wall 2a and the lower wall 2b, respectively.

The sleeve blank 2' comprises a first portion 2a' intended to form the upper wall 2a of the sleeve and a second portion 2b' intended to form the lower wall 2b of the sleeve. A third portion 2c' and a fourth portion 2c'' are intended to form the first side wall 2c of the sleeve, the fourth portion 2c'' being intended to be positioned inside the third portion 2c'. In a corresponding way, a fifth portion 2d' and a sixth portion 2d'' are intended to form the second side wall 2d of the sleeve.

A seventh portion 7a' and an eighth portion 7b' are intended to form a first stop tab 7a and a second stop tab 7b, respectively, which act to bring about locking of the insert 3 in the sleeve 2, which is described in greater detail below. As can be seen in Fig. 3, the portions 7a', 7b' which are to form stop tabs have an essentially triangular shape, one of the points of the triangle being located at a free longitudinal edge on the fourth portion 2c'' and the sixth portion 2d'', respectively. The seventh portion 7a' and the eighth portion 7b' project outside the free longitudinal edge on the fourth portion 2c'' and the sixth portion 2d'', respectively, and they are intended to be folded at respective lines 7a'', 7b'' inside said free edges.

Alternatively, the portions which are to form stop tabs can have a shape other than triangular, for example rectangular.

When the sleeve blank is folded, the fourth portion 2c'' and the sixth portion 2d'' are folded so that their free longitudinal edges are positioned at the connection between the upper wall 2a and the first side wall 2c and the second side wall 2d, respectively, of the sleeve. The seventh portion 7a' and the eighth portion 7b' are then folded so that they are positioned at an angle to the upper wall 2a and the first side wall 2c and the second side wall 2d, respectively, of the sleeve; they then form the first stop tab 7a and, respectively, the second stop tab 7b. Each stop tab is therefore connected to the respective side wall and forms an angle in relation to the same by bearing against the upper wall.

Fig. 4 shows the folded-together and heat sealed sleeve with certain concealed parts marked by broken lines. The first stop tab 7a and the second stop tab 7b are located on the inside of the sleeve, in respective corners formed by the upper wall 2a, and the first side wall 2c and the second side wall 2d, respectively. The first stop tab 7a and the second stop tab 7b are also located at a distance from a rear wall 2e of the sleeve 2.

Fig. 5 shows, for the sake of clarity, a part of the sleeve 2 cut out, in perspective at an angle from below. The second stop tab 7b extends from the inside of the second side wall 2d to the inside of the upper wall 2a. The stop tab 7b therefore extends at an angle to the walls 2a, 2d of the sleeve so that at least a part of it is located in a part of the area for the movement of the insert 3 in the sliding direction S. As described in greater detail below, the stop tab 7b acts by contact with the insert 3 in order to prevent the latter from being drawn out of the sleeve 2. The fact that the stop tab 7b extends inside the walls of the sleeve and is separated from these ensures that its functioning is not sensitive to wear of the same after repeated use. Furthermore, a solution is achieved, in which the stop tab is separated from the sleeve walls without a means, such as a projecting part, intended especially for the purpose being required.

As can be seen in Fig. 5, the stop tab 7b is also angled in relation to the sliding direction S of the insert 3, so that that part of the stop tab located closest to the opening 4 of the sleeve is located closer to the sleeve walls 2a, 2d than the other parts of the stop tab. By virtue of this, when the insert is inserted into the sleeve, parts of the insert 3 intended for locking, which are described in greater detail below, can, by elastic deformation on contact with the stop tab 7b, pass the latter and "snap" back after passing. This design of the stop tab 7b also means that it is very strong and can withstand great forces when attempts are made to draw it out without an unlocking manoeuvre as described below.

Fig. 6 shows the insert 3, and Fig. 7 shows a blank 3' for manufacturing an insert by means of folding and if appropriate heat sealing. The insert blank comprises portions 6' for making the beam 6 mentioned above.

The insert 3 comprises a bottom part 3a, a first side part 3b and a second side part 3c. In the inserted state of the insert, the side parts 3b, 3c are located essentially parallel to and next to the side walls 2c, 2d of the sleeve 2. The side parts 3b, 3c

extend essentially in the sliding direction S, intended for the insert, in the sleeve 2. They are connected to the bottom part 3a and are oriented essentially at right angles thereto.

Each side part 3b, 3c has a notch 8a, 8b. At the notches, a first locking edge 9a and a second locking edge 9b are formed, respectively. In the inserted state of the insert, the locking edges 9a, 9b are located slightly closer to the rear wall 2e of the sleeve than the stop tabs 7a, 7b, and, if attempts are made to draw the insert out of the sleeve, this is prevented by virtue of the side parts 3b, 3c coming into contact, in the area of the locking edges 9a, 9b, with the first stop tab 7a and the second stop tab 7b, respectively.

As can be seen in Fig. 3, the sleeve blank 2' has holes 10a', 10b', referred to as outer holes 10a', 10b' below, on the third portion 2c' and the fifth portion 2d', and holes 10a'', 10b'', referred to as inner holes 10a'', 10b'' below, on the fourth portion 2c'' and the sixth portion 2d''. The inner holes 10a'', 10b'' are each covered by a flap 101 which, at an essentially straight edge of the respective inner hole, is connected to the sleeve blank so that the flap is pivotable about the straight edge.

In the finished state of the sleeve 3, the first side wall 2c and the second side wall 2d comprise parts of the third and the fourth portion 2c', 2c'', and the fifth and the sixth portion 2d', 2d'', respectively. In this regard, the third portion 2c' and the fifth portion 2d' are located outside the fourth portion 2c'' and the sixth portion 2d'', respectively. The flaps 101 and the outer holes 10a', 10b' are adapted in terms of size so that the flaps 101 extend outside the area of the respective outer hole 10a', 10b' so that they are pivotable only inwards in the package. The flaps are then prevented from being moved outside the package and in this way being damaged.

As can be seen in Figs 1, 2 and 4, the inner holes 10a'', 10b'' and the outer holes 10a', 10b' form, in the finished folded sleeve 2, a first hole 10a and a second hole 10b in the first side wall 2c and the second side wall 2d, respectively. The package is adapted so that a user can grip across the package with a thumb/forefinger grip. The user can then press a finger on each of the holes 10a, 10b in order to move the flaps 101 inwards and, on the inside of the sleeve, to press the side parts 3b, 3c of the insert so that these, at least in the area of the locking edges, are deformed elastically so that they are inclined inwards in the sleeve 2, which can be seen in Fig. 8 (where only one side part 3c is shown). The locking edges 9a, 9b are then

moved away from the side walls 2c, 2d of the sleeve. In this way, the locking edges 9a, 9b come to lie, seen in the sliding direction S of the insert 3, outside the area of the extent of the stop tabs 7a, 7b, and the insert can, by means of a thumb/forefinger grip at the gripping notches 5 (described above with reference to Figs 1 and 2) with the other hand of the user, be drawn out of the sleeve.

The width of the package is preferably adapted so that people with small hands, for example children, cannot reach across the package with thumb and forefinger in order to manoeuvre the locking by the locking edges 9a, 9b. Opening of the package therefore requires the use of two hands of the size of those of a normal adult.

The design of parts intended for locking in longitudinal side parts of the insert results in a strong construction, and thus in combination with a reinforced board a reduced risk of the insert being drawn out by force, for example by a child.

Fig. 9 is a schematic cross-section of a coated board applicable for the carton package described above with reference to Figs 1 – 8. The coated board would form the blanks shown in Figs 3 and 7, and thereby the entire package, i.e. the sleeve and the insert, and thus also the locking mechanism which is part of the sleeve as described.

The coated packaging board 11 of Fig. 9 comprises a board base 12, which is preferably a multilayer kraft board of a weight in the interval 170 to 500 g/m^2, preferably 200 to 300 g/m^2. On both sides of the kraft board base 12 there is an extruded layer 13 of tough polymer, preferably polyethylene terephtalate (PET), each PET layer having a weight of 30 to 100 g/m^2, preferably 40 to 60 g/m^2. The multilayer structure may be symmetrical with respect to the board base 12, the PET layers on opposite sides of the board base then having similar coating weight.

The coated board 11 shown in Fig. 10 differs from that shown in Fig 9. principally in that there is an extruded polymer coating layer 13 only on one side of the board base 12. The material and weight of the board base may be as above, and the single polymer layer preferably is a PET layer having a weight of 30 to 100 g/m^2, preferably 40 to 60 g/m^2. In making the package the PET coated side of the board would be used to form the outer surface of the sleeve and the insert.

Fig. 11 shows the coated board 11 preferably used for the package described in Figs 1 – 8. The coated board of Fig. 11 corresponds to that shown and described in connection with Fig. 9 above, but has an outer heat seal polymer layer 14, preferably of LDPE, on both sides thereof. Each of the LDPE layers 14 has a weight of 15 – 60 g/m^2, preferably 20 – 40 g/m^2. The PET and LDPE layers 13, 14 may be brought to the fibrous board base 12 at a single manufacturing step by coextrusion.

In the manufacture of the package 1 the polymer coating layers 13, 14 are used to form the heat seals as required in the sleeve and in the insert. Fig. 12 shows the bottom side of the sleeve 2 comprising two parallel seams 15, in which two opposite edges of the sleeve blank 2′ have been brought to overlap with the lower wall portion 2b′. In the case of the boards 11 with polymer coatings on both sides as shown in Figs 9 and 11 the coating layers 13 or 14 on the overlapped parts of the blank are fused together by means of heat sufficient to melt the polymer. In the case of the singly coated board of Fig. 10 the overlapped parts are sealed by melting the single polymer layer 13 on one part to attach it to the adjacent uncoated board surface of the other part.

Figs. 13 and 14 show as a further embodiment of the invention protection of a seam 15 of the outer sleeve 2 against delamination of the coated board. Delamination starting from an exposed seam 15 on the outside of the package is one of the possible ways of disruption the package may suffer in children's hands. Delamination could occur either by the polymer coating peeling off from the board base or between adjacent layers of a multilayer fibrous board.

In Fig. 13 an edge portion 16 of a blank 2′, which is made of a coated board 11 as shown in Fig. 11 and has the design as shown in Fig. 3, has been skived from one side of the blank, to reduce its thickness approximately to a half. It should be understood that such skiving is carried out particularly for the parts of the blank 2′ forming exposed seam edges 15 on the outside of the finished sleeve 2.

In Fig. 14 such a seam is shown between overlapped parts 17, 18 of the blank 2′ of Fig. 13 as it has been folded and heat sealed to form the sleeve 2. The part 17 having the skived edge portion 16 is the outer board part at the seam, lying on the outside ot the sleeve, more particularly in its bottom as the blank 2′ and the sleeve 2 have the configurations as seen in Figs 3 and 8, respectively.

As seen in Fig. 14 the skived edge portion 16 of the outer board part 17 with reduced material thickness has been bent twofold, the outside coating layers thus enclosing the fibrous board base 12 at the seam edge 15 and extending to lie against the outside coating layers of the inner board part 18. The seam between the parts 17, 18 has been produced by heat sealing the adjacent heat seal layers 14, 14′ within an area denoted as 19 in Fig. 14, the outer heat seal layer 14′ of the inner part 18 being fused together with parts of the inner as well as the folded outer heat seal layer 14 of the outer part 17. If desired, an adhesive may be applied to the raw board base 12 surface produced by the skiving so as to provide inner structural strength for the fold.

An alternative manner of shielding the seams 15 against delamination would be application of glue on the cut raw edges thereof, so as to close the pores in the fibrous board base 12. Preferably such gluing would be carried out for any cut edge portions exposed to the outside of the package 1.

In the embodiment shown in Fig. 15 the edge portions of the blank 2′ forming the seams 15 have been extended to bring the cutting edges into a protective contact with each other, to make them resist tampering and the risk of delamination.

Fig. 16 shows as a further embodiment shielding of the raw cut edges at the seams 15 as well as around the holes 10 of the sleeve 2 by covering them with an adhered protection film 20 of a tough plastic material. According to Fig. 17 similar protective film 20 has been applied around the opening part 4 of the outer sleeve 2, to shield the cut edges 21 thereof against tampering and delamination. Otherwise the material for the sleeve 2 may be any one of those described in connection with Figs. 9 – 11.

Example

A coated board was prepared by using packaging board of grade Cupforma Classic by Stora Enso, having a weight of 210 g/m^2, as board base. This board was extrusion coated on one side or on both sides thereof with a PET layer of a weight 50 g/m^2. The tearing strengths measured according to the standard SCAN-P 11:96 are presented in the following table:

TABLE

	Coating on both sides	Coating on one side	Uncoated
Tearing strength m.d. (mN)	3114	2724	1902
Tearing strength c.d. (mN)	3083	2904	1924

m.d. = machine direction
c.d. = cross-machine direction

A package according to Figs 1 – 8, made by gluing of a packaging board grade with a weight of 250 g/m^2 and having a PET coating layer of 50 g/m^2 on both sides thereof, was subject to a successful pilot child resistance test according to standard ISO 8317. For comparison, a similarly designed package manufactured of a packaging board grade with a weight of 315 g/m^2 and without the PET coating layers failed in a corresponding test.